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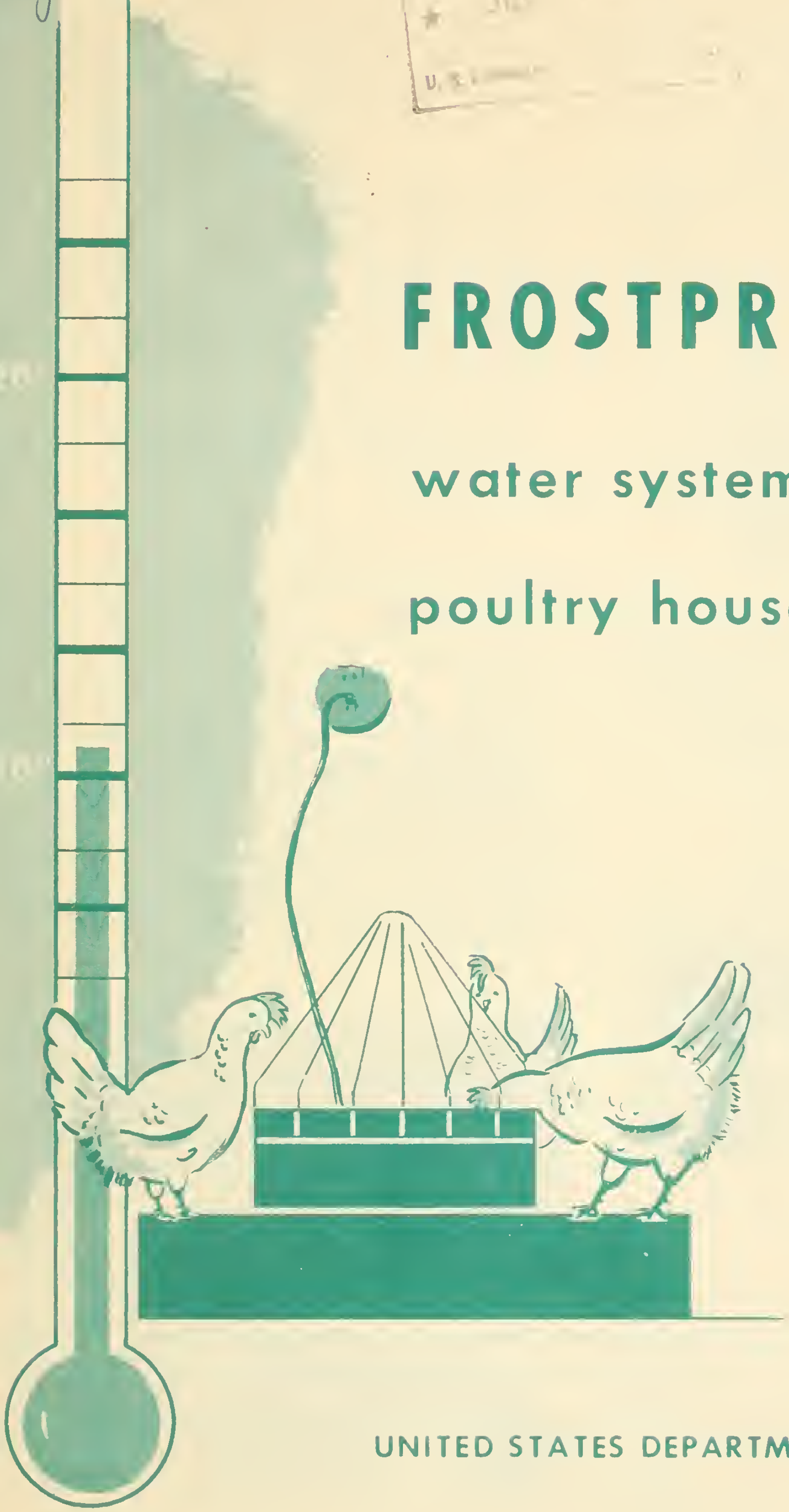


FROSTPROOFING

water systems in poultry houses

Leaflet No. 434

UNITED STATES DEPARTMENT OF AGRICULTURE

Frostproofing Water Systems in Poultry Houses . . .

Poultry need a constant supply of drinking water for maximum egg production and proper growth.

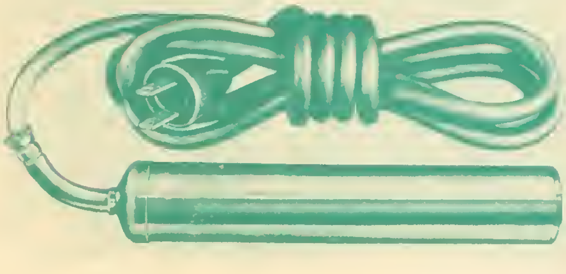
Maintaining a constant water supply during cold weather is often difficult. Drinking vessels freeze; pipes may burst.

You can prevent the water in watering equipment from freezing by using electric warmers. You can protect the pipes in a water supply system with electric heating cable. The cable may also be used to prevent the water in trough-type waterers from freezing.

Electric Water Warmers

Two general types of electric water-warming units for poultry watering equipment are available—immersion and external. An immersion warmer heats the water directly; the heating element is placed in the water. An external warmer heats the container that holds the water.

Drinking fountains with built-in heating units are also available.



Immersion poultry water heater.

Selection

Water warmers have the wattage rating stamped on them. This rating indicates the heating capacity. To obtain a warmer of the correct heating capacity, consider the size of the watering equipment, and plan to maintain the water temperature at not less than 40° F.

Tests show that immersion warmers are more efficient than external warmers. The heating capacity of an immersion warmer need not be as high as that of an external warmer to heat a given quantity of water.

For example, to prevent the water in a 14-quart bucket from freezing at 0° F., you need an immersion warmer rated at 50 watts or more. (An external heater of 75 watts or more would be needed.) To prevent the water in an 8-gallon fountain from freezing at 0° F., you need an external warmer of 150-watt capacity.

Insulating the drinking vessel reduces the heating requirement 20 to 40 percent.

Operation

Following are some general instructions for operating electric water warmers:

Install the convenience outlets for the warmers on a circuit separate from the lamps in the poultry house. During cold weather you may need to use the warmers in the daytime while the lamps are turned off. In mild weather the warmers will not be needed.

Water warmers are designed to operate on a specific voltage. Connect them to a power supply of the specified voltage. If the voltage is lower than that specified, the warmer will put out less heat than the rated heating capacity. If the voltage is more than that specified, the warmer will use more wattage.

Drinking containers heated by cartridge-type immersion warmers.

Since the wattage rating is comparatively low, it takes considerable time to heat the water. Therefore, operate the warmers continuously during cold weather. It is especially important to do this if the poultry house lights are turned on in the morning. A thermostat can be installed to turn on or shut off the power as the water becomes cold or warm. This reduces the cost of operation.

Electric Heating Cable

Electric heating cable protects pipes in a water supply system against freezing even in the coldest weather. Its use saves labor and may save expense. Pipes do not have to be drained when the temperature drops to freezing. Water does not have to be carried from other sources because of frozen pipes. There is no expense of replacing frozen pipes. Most important, your poultry have a constant supply of drinking water.

Several types of electric heating cable are available. Heating capacity of the cables ranges from 2.5 to 10 watts per foot. The type most frequently used has a heating capacity of 5 watts per foot.

Protecting Water Pipes

HEATING REQUIREMENTS

The length of cable you need depends on the total length of piping and the amount of heat (number of watts per foot of pipe) required. The amount of heat required depends on the size of the pipe and the minimum temperature at which it must be protected. Construction of the poultry house, location of the piping, and the supply of heat from the birds or other sources affect the minimum temperature.

Types of electric heating cable for protecting pipe from freezing.

Installation of heating cable on outside of water pipe.

Table 1 indicates the wattage required to heat various sizes of pipe at temperatures ranging from −10° F. to 20°.

TABLE 1.—*Wattage requirements for electric cable installations*

Pipe size	*Pen temperature*	*Watts required per foot of bare pipe*	*Watts required per foot of pipe with 1-inch insulation*
½ inch	−10° F.	8. 0	2. 50
½ inch	0° F.	6. 0	2. 0
½ inch	10° F.	4. 50	1. 25
½ inch	20° F.	3. 0	. 75
¾ inch	−10° F.	10. 0	3. 0
¾ inch	0° F.	7. 75	2. 50
¾ inch	10° F.	5. 50	1. 75
¾ inch	20° F.	3. 50	1. 0
1 inch	−10° F.	12. 25	3. 50
1 inch	0° F.	9. 75	2. 75
1 inch	10° F.	6. 75	2. 0
1 inch	20° F.	4. 25	1. 25
1¼ inch	−10° F.	15. 50	4. 75
1¼ inch	0° F.	12. 25	3. 75
1¼ inch	10° F.	9. 0	2. 75
1¼ inch	20° F.	5. 25	1. 50

INSTALLATION

There are two methods of installing the cable. It may be run through the pipe in the water or it may be attached to the outside. The first method is more economical in power consumption but the installation is more difficult. Most farmers prefer the second method.

The cable may be attached to the outside of the pipe in either of two ways. It may be wrapped around the pipe in spiral fashion or it may be fastened parallel to the pipe.

Attach the cable securely to the pipe with friction or adhesive tape. To protect the tape from rat damage, apply a mixture of equal parts of sand, paint, and asphalt.

Use particular care in installing the cable in places where it might be damaged. Common trouble spots are (1) where the pipe passes through the floor, (2) close to a post or wall, and (3) near a wire guard or drinking trough.

Precautions

Observe the following precautions when attaching the cable to the outside of the pipe:

Do not cross a section of cable over itself.

If two different sections of cable are crossed over each other, separate them with a piece of tin 2 inches square. Do not insulate the cables at that point.

Do not shorten the length of a cable. A shortened or cut cable will become too hot and may burn out. Do not coil or bunch excess lengths.

Some plastic cables are brittle when cold. Warm the cable before installing or removing it.

Connect a thermostat in the line when the cable is used to protect plastic water pipe. The maximum allowable temperatures for ordinary plastic pipe range from 100° F. to 120° F.

The branch circuit serving each cable installation should be fused at the distribution center. The wattage rating of the fuse should not exceed 115 percent of the total connected load.

Install a thermostat assembly to turn on or shut off the circuit as the temperature fluctuates. Install it on the coldest part of the pipes to assure protection of the entire system. Use of a thermostat reduces energy consumption.

Connect cables having a total heating capacity of less than 500 watts to a 110- to 115-volt power supply. Connect cables having a total heating capacity of more than 500 watts to a 220- to 230-volt power supply.

Consult your power-supply representative or a competent electrician for assistance in installing thermostats, making difficult installations, and installing large numbers of cables.

Protecting Water in Troughs

HEATING REQUIREMENTS

Table 2 indicates the wattage required per foot of trough to maintain water at various temperatures.

TABLE 2.—*Wattage requirements for trough waterers*

Pen temperature	*Watts per foot of trough to keep water at—*	
	35° F.	*50° F.*
15° F	7	-------
20° F	5	14
25° F	3	10
30° F	1. 5	8

INSTALLATION

Poultry may pick at the covering material on the cable in a trough. They may even attempt to pull the cable out of the trough. To protect the cable, coat it with an asphalt emulsion or encase it in a heavy spring.

Cost

The cost of electric heating cable depends on the length and type, and runs 6 to 20 cents per foot. The cost of operating a 26-foot section of cable (60 watts) will average about 3.5 cents per 24-hour period (electricity at 2.5 cents per kilowatt-hour). The use of a thermostat will reduce the operating cost considerably.

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